STATE OF WISCONSIN

TECHNICAL PLAN TO SUPPORT STATEWIDE COMMUNICATIONS INTEROPERABILITY

STATE INTEROPERABILITY EXECUTIVE COUNCIL

June 12, 2006

Acknowledgements

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Executive Summary

The development of a statewide solution for the improvement of radio communications is a top priority for Wisconsin's public safety community. A critical need faced by emergency responders throughout the state is increased interoperability. Simply put, communications interoperability is the ability of responders to talk with other agencies on demand, in real time, when needed, and when authorized.

This document outlines a strategy for a technical solution that will significantly improve radio communications interoperability within a three to seven year time frame.   This technical plan was developed by the State Interoperability Executive Council (SIEC), the state governance body established by Governor James Doyle through an executive order on February 2, 2005 (See Appendix A for more information on the SIEC). Plans for governance, operational standards, training, and exercising will be defined in subsequent plans that will eventually be merged into a comprehensive communications interoperability strategy.

The plan proposes a series of steps organized into two parallel and complementary goals: a short-term goal to be completed within three years, and a long-term to be implemented in phases over the next seven years. The goals can be summarized as follows:

- **Short-term Goal** – ensure all public safety agencies in the state have access to common mutual channels. Mutual aid channels enable responding agencies to communicate via designated shared frequencies when responding to a large incident. Implementing this goal will involve extensive re-programming and replacement of radios along with infrastructure in each county to support the frequencies.

- **Long-term Goal** – implement the Wisconsin Public Safety Communications System (WPSCS), a standards-based shared VHF/700/800 MHz hybrid P25 trunking system. The WPSCS will be based on a multi-path, redundant backbone used to interconnect the individual systems to a common communications trunk that will integrate regional 700/800 MHz systems with VHF users.

The plan will enable Wisconsin to move forward with the implementation of a long-term solution while simultaneously taking sufficient steps to improve communications interoperability for emergency responders in the near-term. The hybrid "system of systems" envisioned by the long-term goal will serve the needs of public safety agencies at all levels of government by building on existing infrastructure and technologies, not just replacing them. The system will balance the need for cross-border interoperability with the acknowledgement that communities have invested significant resources to build systems that meet local needs.

Along with providing the technical direction for the state as a whole, this plan is intended to provide guidance to Wisconsin's communities so that as they make local decisions to replace or upgrade existing systems, they are empowered to implement new technologies and systems that will complement and promote the state's goals for interoperability.

Wisconsin's plan outlines a bold strategy for creating a system that will give responders the necessary tools to more effectively work together to handle emergencies, making communities safer for Wisconsin's citizens.   The cost of this interoperability solution will be high, and the funding sources are not yet known. What is known is that current cost estimates exceed the availability of federal funding, and the eventual costs will have to be shared by all communities and levels of government in the state. However, Wisconsin is now at a junction where the

leadership, the desire, the technology, and now the strategy are in place. Ultimately, it will take the collective effort and resources of the emergency response agencies and governments throughout Wisconsin to make it happen.

Introduction

The ability to communicate is widely regarded as one of the most vital elements of an effective emergency response. Yet the inability of emergency responders to talk to personnel from different agencies and jurisdictions via radio has been a problem for decades, and continues to plague public safety response in communities throughout the country. The communication breakdowns that occurred during recent catastrophes at the World Trade Center and on the Gulf coast hampered the response work and led to greater loss of life. Despite the efforts of recent years, many of these problems also persist in Wisconsin. Improving the interoperability of communications systems is both a state and national priority.

Communications interoperability is the "the ability of public safety and service agencies to talk within and across entities and jurisdictions via radio and associated communications systems, exchanging voice, data and/or video with one another on demand, in real time, when needed, when authorized." [1] In addition, several types of interoperability are typically distinguished: day-to-day interoperability, which covers routine public safety operations; mutual aid interoperability, which supports joint response to large-scale incidents; and task force interoperability, which covers multiple agencies collaborating for prolonged periods to address particular problems that can be planned for in advance.[2]

The full spectrum of elements, activities, and steps needed to achieve interoperability is illustrated by the Interoperability Continuum published by the Department of Homeland Security Office for Interoperability and Compatibility's SAFECOM program.
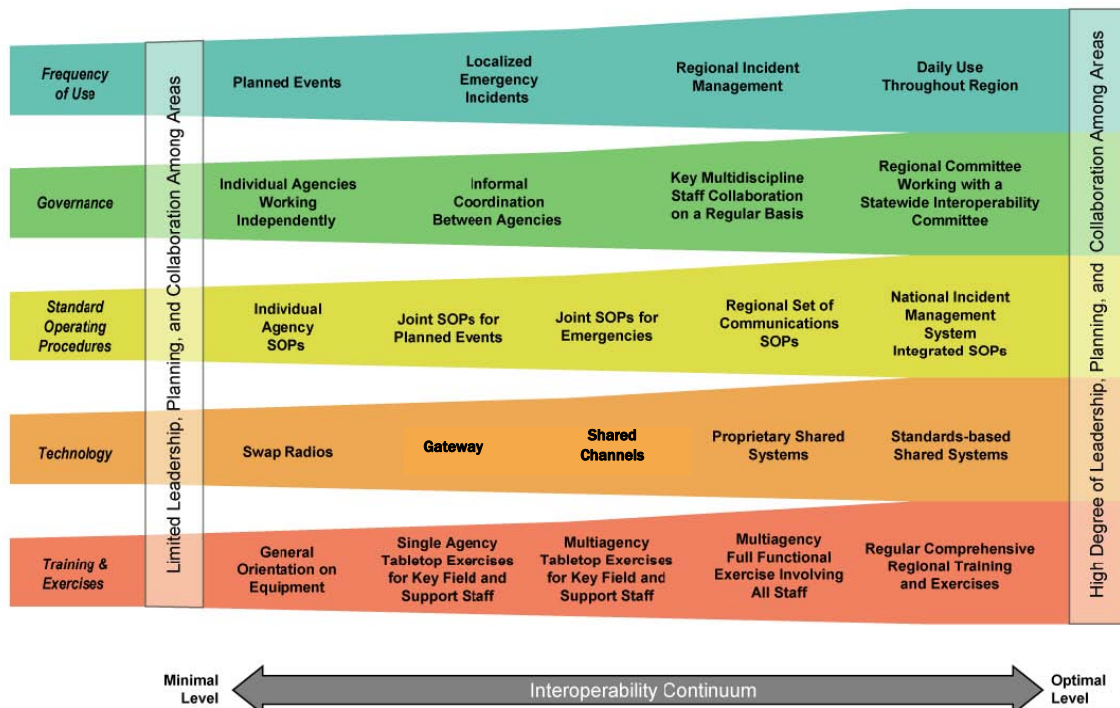
Figure 1: SAFECOM Interoperability Continuum

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[1] Department of Homeland Security, *Target Capabilities List 2.0: A Companion to the National Preparedness Goal*, December, 2005. This language refines and expands on an earlier definition offered by prior national efforts, including the National Task Force on Interoperability, *Why Can't We Talk?* February 2003, and AGILE, *Guide to Radio Interoperability Strategies and Products*, March 2003

[2] Final Report of the Public Safety Wireless Advisory Committee, September 11, 1996.

As the continuum clearly shows, communications interoperability involves not just the implementation of technology; it also requires attention to governance, training and exercising, and operational issues. The Interoperability Continuum was designed by SAFECOM to assist policy makers to address the critical elements for success as they plan and implement interoperability solutions. The continuum does not necessarily represent steps in a linear path through which the state is expected to pass on its way to interoperability. Rather, it a picture that shows the relationship among the key facets of interoperability as well as a road map that can be used to identify short- and long-term goals. Optimal levels of interoperability are depicted on the right-hand side of the continuum. The interdependency of the interoperability elements means that making simultaneous progress in all aspects is essential.

The plan described in the following pages addresses one aspect of this continuum, outlining near-term and long-term goals for developing the technical component of an interoperable communications in Wisconsin. The short-term goal detailed in this plan is intended to achieve level 3 on the continuum within thee years, while implementation of Wisconsin's long-term goal will enable the state to reach the fullest level of interoperability reflected in level 5 on the continuum.

This plan recognizes the importance of the other interoperability elements. True interoperability is not achievable only through technical solutions; technologies must be institutionalized, trained upon, exercised and used in order to be effective. In many respects these human aspects of interoperability are far more complex than the technical issues. Complementary plans that will provide guidance on training and exercising, governance, operations, and usage are currently in development. Thus, this plan is only one part of a five-part strategy that will eventually be merged into one comprehensive communications interoperability plan.
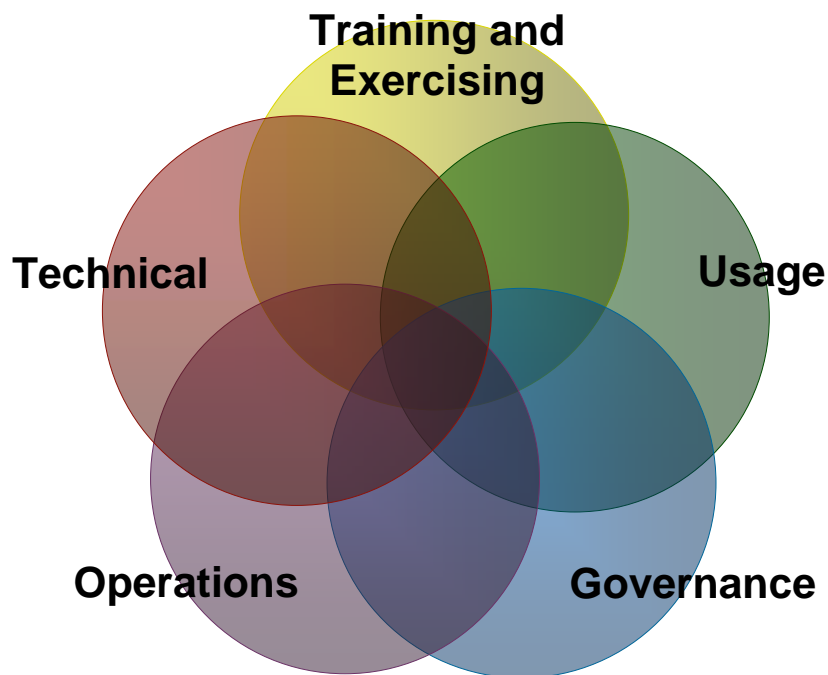

Figure 2: Wisconsin's Comprehensive Interoperability Strategy

Background

The development of an interoperable communications system has been a priority in Wisconsin for several years. The current plan builds upon the progress that has been made during this time. Early in 2003, the State recognized that there was an immediate need to gain a clearer understanding of the current capabilities of radio communications as a prerequisite to developing a plan for moving forward. To fulfill this need, the State commissioned a needs assessment that was completed by the firm Federal Engineering in July 2004.[3] The needs assessment drew on the Public Safety Communications Survey administered by Wisconsin Emergency Management (WEM) in 2003. This was supplemented by information gathered through twenty-eight structured interviews with public safety stakeholders in February/March 2004.

The assessment included a number of recommendations related to governance, financing, and technical and operational specifications. Chief among the recommendations for governance was the creation of a formal state-level governance body to ensure the highest level of support for the effort.   Recognizing this need, Governor James Doyle established the State Interoperability Executive Council (SIEC) through Executive Order #87 on February 2, 2005 (see Appendix A for the complete executive order and description of the SIEC). The SIEC provides the leadership and coordination necessary to successfully implement an interoperability solution in the state. The SIEC has guided the development of this plan and endorses the recommendations contained herein.

One of the first steps taken by the SIEC was to organize a series of listening sessions held regionally around the state in June of 2005.   The purpose of the listening sessions was to gather stakeholder feedback that could help shape the future activities and goals of the SIEC. Attendees of the listening sessions stressed the need to develop a strategic plan and implement a process quickly, balancing the need uniform state standards and guidance with the need for local flexibility and control. Stakeholders advocated against the implementation of single statewide system because it would not meet the differing geographic and demographic needs of Wisconsin's communities.

This feedback echoed the recommendations of the Statewide Needs Assessment. The final report identified four possible alternative solutions to interoperability in Wisconsin:
1. No Common Architecture – "Do Nothing" Approach
2. Governance/Standards Guidance-Only Approach
3. Single Statewide System
4. Hybrid Statewide System

Taking into account the relative improvement of interoperability, the cost-effectiveness of the approach, the time needed to implement, and the impact to existing systems, Federal Engineering ultimately recommended option 4, a hybrid statewide system, as a long-term interoperability solution. The report recommended that the system use Project 25 trunking and be located in the VHF High-Band frequency spectrum for existing systems and new users, while maintaining the existing 800 MHz systems that are already in place in some urban areas of the state. Federal Engineering also recommended a mix of short- and medium-term activities that include a build out of mutual aid channels throughout the state, expanded dispatch capabilities, and the use of gateway technologies (ACU-1000).

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[3] Federal Engineering, Inc., *Statewide Needs Assessment and Plan for the Improvement of Public Safety Radio Communications Systems in Wisconsin*, July, 2004.

While the plan was being developed, the State provided $1.8 million in FFY04 Homeland Security Grant Program (HSGP) funding to conduct 14 state, county, and regional engineering studies that assessed technical needs and developed plans for upgrading regional communications systems. Subsequent to these studies, $3 million more in FFY04 grants was distributed to begin implementing these systems. The funding supported microwave links and hardware/software to enable access to mutual aid channels that when fully implemented will create the means for inter-county interoperability in much of the state for the first time. More recently, an additional $8 million in FFY05 HSGP funding was released to begin implementing the short-term goal of this plan.

Apart from the technical improvements, one positive result of the interoperability grants was that they helped foster increased regional cooperation among counties, and had the effect of causing the creation of several regional interoperability groups. Several regional groups are now operating within the state, including the Northeast Wisconsin Communications (NEWCOM) group, the West Central Interoperability Alliance (WCIA), the Northwest Radio Users (NWIOU), a central three-county effort, and a southeast Wisconsin regional group. Together these regional efforts account for 43 of Wisconsin's 72 counties, and region-based funding initiatives are encouraging the regionalization of the remainder of the counties. The state is ensuring that these regional systems will link at key exchange points.

State, tribal, and local agencies have taken the initiative by implemented numerous communications projects over the past several years using various sources of funding. Many of these projects have replaced and upgraded antiquated equipment, increased local coverage area, and otherwise helped lay the groundwork for current and future interoperability efforts.

Current Status

Despite the progress made in recent years, there is still a great deal of work ahead for Wisconsin in order to achieve an acceptable level of interoperability. Significant investments in infrastructure, user-end upgrades, and new technologies will be required over the coming years in addition to operational and institutional changes.

Assessments of the status of interoperability in Wisconsin were conducted in 2003 by WEM and in 2004 by Federal Engineering. While these assessments are now somewhat outdated, they afford a snapshot of communications capabilities and are summarized in Section I of the Federal Engineering needs assessment.

In general, public safety agencies around the state were found to be operating aging radio communications equipment using wideband analog VHF frequencies in conventional mode, with some areas of the state operating in 800 MHz and a few counties operating in VHF digital. At the time of the survey, very few agencies had upgraded their systems to Project 25 (P25) [4] compliant standards due to the relatively high cost of the equipment. Funding requirements and increasingly competitive pricing over the past three years has undoubtedly led to more widespread use of P25 equipment, but users of P25 systems, particularly among fire and EMS agencies, are still presumed to be in the minority.
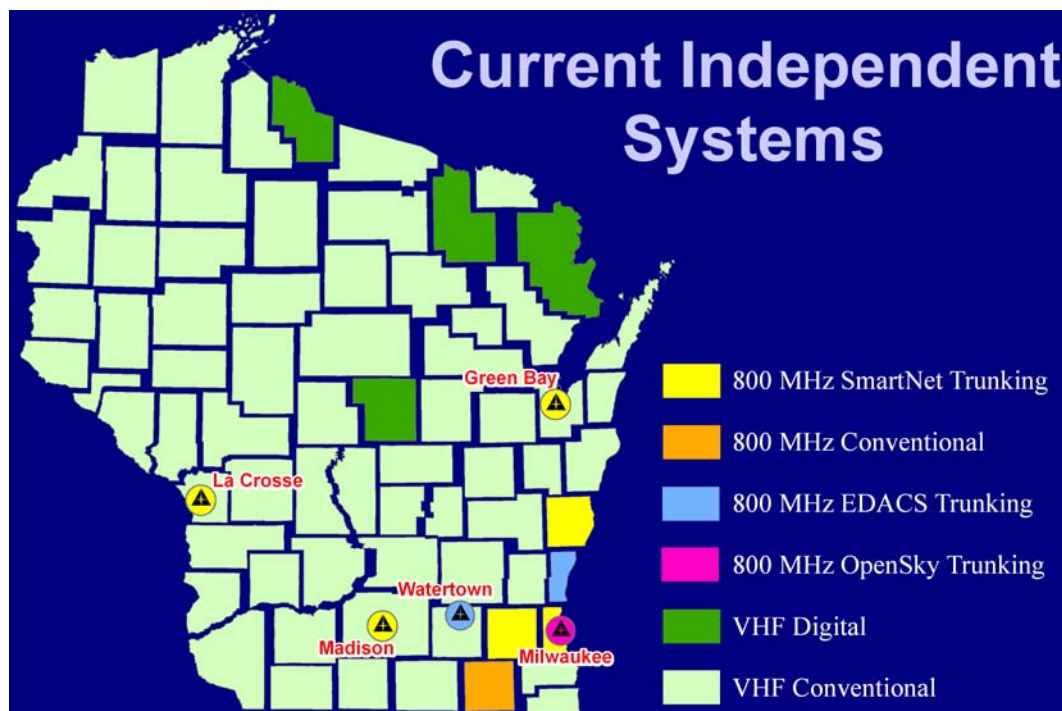
Figure 3: Current Independent Communications Systems

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[4] Project 25 refers to a suite of standards developed by the Association of Public Safety Communications Officials (APCO) designed to increase the interoperability of digital two-way radio technology used by public safety organizations. Among other features, the radios can be operated in either digital or analog mode, conventional or trunked systems, and are backward compatible with legacy systems.

The Wisconsin statewide network will incorporate the many stand alone systems interconnected into a larger system—a system of systems. Many of the current systems are in need of replacement; when these systems are replaced, use of a common design standard and an open source architecture will allow close interconnection to the statewide network. There are many additional systems that are currently state of the art although not designed to a common standard (P25) and therefore will require the inclusion of bridges or gateways to interconnect them to the statewide system. This is a common problem and many manufactures have developed solutions to address it at various levels of bandwidth requirements.

Mutual Aid Channels

Mutual aid channels enable public safety agencies to communicate via shared frequencies that are pre-programmed into radios and used during incidents that involve multiple agencies. Statewide mutual aid frequencies (MARC, WISPERN, IFERN and Point-to-Point) are available through out the State of Wisconsin. Appendices B and C detail the mutual aid frequencies available in Wisconsin and outline plans for their use. The SIEC endorses the continued use of mutual aid frequencies and encourages their expanded use throughout the state.

A statewide Project 25 unit identification plan (Appendix D) has been developed by the state. The purpose of the plan is to provide a logical plan for the assignment of unique radio identifiers in all potential Project 25 compliant radios used by public service agencies within the State of Wisconsin. SIEC endorses this plan and highly encourages all agencies using Project 25 radios to adopt this plan.

The use of mutual aid channels across the state is fairly widespread, with 85% of VHF agencies and 80% of 800 MHz agencies accessing at least one channel in 2003. Most systems, however, accessed less than five channels, and only 120 systems out of 2900 (.04%) reported using all ten mutual aid channels. Moreover, over 300 VHF systems reported no use of any of the frequencies. POINT and WISPERN are the two most frequently used channels, while the MARC channels are used by less than a third of agencies. Counties with MARC repeaters are shown on the map in Appendix B.

Gateways

Gateways retransmit across multiple frequency bands providing an interim interoperability solution as agencies move toward shared systems. However, gateways are inefficient in that they require twice as much spectrum because each participating agency must use at least one channel in each band per common talk path, and because they are tailored for communications within the geographic coverage area common to all participating systems. They are also generally most effective for pre-planned events and are less effective when they need to be deployed quickly during an emergency.

The Wisconsin statewide network consists of a large number of stand alone systems interconnected into a larger system; a system of systems and as such will contain a number of gateways. Some of the gateways will be used as Radio Frequency to Radio Frequency interconnects and others as Radio Frequency to lower level system interconnections. Because the statewide system will use VHF, 700-800MHz and 4.9GHz RF bands, gateways will be designed into the system to provide the interoperability ports between systems.

WEM maintains several portable gateways with hardware configurations that allow them to be moved to any part of the state and setup to provide increased interoperability to a given area on short notice.

The JPS ACU-1000 interoperability gateways currently available in the state include:
     Wisconsin Emergency Management – 2
     Dane County
     Kenosha County
     Milwaukee County – 2
     Pierce County
     Walworth County

While gateways provide an cost-effective interoperability solution that is available within the state now, Wisconsin's long-term goal is to move away from gateway technology as a means of interoperability at the interagency level.

Swapping Radios

Wisconsin also currently achieves some degree of interoperability through the swapping of radios. The lowest level of interoperability on the SAFECOM Interoperability Continuum is the swapping of radios. This can be implemented in two ways; the first way is to have a number of portable radios that are held in reserve, over and above the units in daily service and are issued to those who need then when the occasion arises. This solution to interoperability has several drawbacks to it; the radios must be periodically tested and the batteries must be maintained charged so the units are ready to be put in service without a delay; another disadvantage to this process is the users may be issued equipment that they are not familiar with operating it in an emergency.

The second method of applying the "Swap Radios" process is to have radio units from ring agencies installed in the communication centers and in vehicles. This creates several problems; physical space is at a premium in most vehicles and the possibility of several radios operating at the same time during an emergency tends to add to the confusion. The practice of having radios from several jurisdictions and agencies is most practical in applications like mobile command post vehicles where there are several operating positions.

WEM has maintained a cache of 70 portable radios for many years. Due to their age, these radios are now in fair condition but some are no longer serviceable. With a 99 channel limitation, the radios are programmed for most statewide interoperability frequencies, frequencies of several state agencies such as WEM, State Patrol, and Dept. of Natural Resources, and many county sheriff channels. Programming of these radios was updated in 2005. WEM has a process for testing and tracking the radios.

WEM's radio cache is frequently requested because of its size, because the radios are on the VHF band, and because the radios are available statewide. These radios should be replaced due to their age, channel capacity limitation, lack of narrowband capability, and increasing difficulty of programming.

Some other agencies have smaller radio caches, however in many cases they can only be used in their local area. For example, Douglas County has a number of UHF radios available but the frequencies they operate on are only available in Douglas County and do not interoperate with other agencies.

Current radio caches positioned around the state should be made available and deployed as necessary in order to provide an interoperable solution available now that can be quickly moved

to an incident. However, it is the state's goal to decrease the reliance on radio caches for interoperability due to the inherent limitations of the method.

Short-term Technical Goal

In the short-term, the state's goal is to ensure all public safety agencies in the state have access to common mutual channels. This goal is achievable in 1-3 years, contingent upon funding and support by state, local, tribal, and federal government.

Mutual aid channels are currently a key element of interoperable communications in Wisconsin, enabling responding agencies to communicate via designated shared frequencies when responding to a large incident. Mutual aid channels support tactical communications during a joint response but require agencies to create a channel plan and have the required channels programmed into their radios in advance of an incident.

Mutual Aid channels are supported by the MARC repeater installations through out the state. Appendices B and C detail the Mutual Aid channels and the frequencies in service for use statewide in Wisconsin. Plans are in place in many regions of the state to increase the availability of MARC repeaters and to have subscriber units programmed with the proper frequencies so as to be able to use them when required.

A concerted effort is needed to ensure that all public safety agencies in the state have the common mutual aid channels programmed in their radios and are trained on the proper use of these channels. Each county dispatch center should have access to a MARC repeater and a WISPERN base. The short-term goal of this plan is to continue the build out of mutual aid channels throughout the state. The plan consists of the following elements:

- Install a MARC repeater in each county that currently does not have one. In addition, support MARC bases/control stations or control links for dispatch centers, voting receiver systems for MARC repeaters, and base stations on other mutual aid channels including WISPERN, IFERN, ICALL/ITAC, and VCALL/VTAC.

- Support re-programming of mobile and portable radios with 16 or more channels that are able to be re-reprogrammed. VHF Radios should include a minimum of 10 mutual aid channels, or as many of the mutual aid channels as capacity allows. The priority for which these frequencies should be programmed into available channels, according to response discipline, is listed on pg. C-21. A full description of each mutual aid channel and the countywide frequencies used in each county are also detailed in Appendix C.

  800 MHz radios should include all 10 of the ICALL/ITAC-4/D channels (listed on pg. C-20). Radios should also be programmed with the frequencies of adjacent agencies.

- Replace mobile and portable VHF radios with less than 16 channel capacity. Radios should:
    - Be P25 Phase 1 compliant and upgradeable to P25 trunking (see Appendix E for P25 compliance definitions)
    - Have 48 channels minimum capacity
    - Programmed according to the Statewide Mutual Aid Frequency Plan (Appendix C) with a minimum of 24 statewide mutual aid channels
    - All P25 radios should be assigned a unique identifier following the state P25 Unit Identification Plan (Appendix D).

- Eliminate frequency usage conflicts on statewide mutual aid channels by encouraging agencies that are currently using one of the mutual aid frequencies for local usage to move their operation to another frequency (jurisdictions where there is a conflict with mutual aid channels are identified in Appendix F).

- Develop and document standards for training, exercises, and operational procedures that will support the use of mutual aid frequencies (specific recommendations will be further detailed in future SIEC plans).

In addition, the plan will make continued use of gateway technology, such as ACU-1000 units, to provide tactical interoperability where it is needed. Units will be supported and deployed based upon regional needed. The state will conduct an evaluation of the current placement of these units and take the following steps if necessary:

- Re-position existing units in order to provide for greater statewide access

- Support additional units if no other unit is available within a 2 hour response time and multiple frequency bands are regularly used in the area

Long-term Technical Goal

The state's long-term interoperability goal is to implement the Wisconsin Public Safety Communications System (WPSCS), a standards-based shared VHF/700/800 MHz hybrid P25 trunking system.   This goal is technically achievable within seven years, contingent upon funding and support by state, local, tribal, and federal government.

As illustrated by SAFECOM's Interoperability Continuum, a statewide standards based shared system is the optimal technical solution to interoperability. While proprietary systems limit the user's choice of product with regard to manufacturer and competitive procurement, standards-based shared systems promote competitive procurement and a wide selection of products to meet specific user needs. With proper planning of the talk group architecture, interoperability is provided as a byproduct of system design.   Wisconsin SIEC endorses a standards based shared "system of systems" and has developed a "Functional Specification" document in support of it. This document will be reviewed and updated as technology and system designs evolve.

The "system of systems" approach will consist of a backbone to which county and local level systems can connect. The statewide WPSCS will be a design based on a multi-path, redundant backbone used to interconnect the individual systems to a common communications trunk. State agencies will partner to operate and maintain the backbone.

The backbone of the system will consist of microwave relay nodes backed up with IP based communications over wire and fiber based networks. The core standard is APCO P25 based, with revisions as additional standards are released. The statewide radio frequency user access will be a VHF P25 trunking system. Regional 700/800 MHz P25 trunking systems will be integrated for seamless operation with VHF users.

The statewide VHF trunking radio system design goal is to provide hand held radio level coverage throughout the state through the use of interconnected tower and console sites. 800 MHz operation will be included at sites as needed and practical, such as in areas ringing 800MHz systems and along heavily traveled routes. County and local level systems, both trunked and conventional, and analog and digital, can connected to the backbone through the methods identified below. The decision as to the level of RF coverage, beyond the planed base, within a county or local jurisdiction will be left up to the agencies at the county and local levels. The goal is to have a P25 compliant design based system in place throughout the state of Wisconsin that will support full interoperability between all state, county, local, tribal and federal agencies.

A statewide system redundant controller will be established to operate the backbone. Use of this controller will be extended to county and local level sub systems. This will provide the highest level of integration, allowing for seamless trunking roaming, and will result in substantial cost savings.

The P25 Inter-Subsystem Interface (ISSI) standard will be the preferred method to integrate county/local systems that have their own system controller and conventional systems. Use of the ISSI will provide a high level of integration, allowing some roaming and the exchange of radio and talk group identification between systems.

Sub systems that cannot connect to the ISSI standard may initially be connected through radio gateways. This method will not support roaming and data exchange between systems and only will be put in place on a interim basis until the sub-system can be brought up to compliance with the standards.

Microwave links are the current method of establishing statewide connectivity between the backbone and the county/local level. Additional microwave systems as well as fiber optic cable and wire lines will have to be used to provide increased bandwidth as the system is put in place, as well as to provide redundant backup, load sharing and conductivity where current microwave network is not sufficient to handle the network traffic.

State government agencies will devote substantial existing frequency resources to the establishment of the VHF radio frequency user access network. Opportunities to acquire additional frequencies suitable for VHF trunking through licensing and purchase will be pursued. However, due to the popularity of the VHF frequency band in Wisconsin, there are not enough available frequencies to complete a build out of the network at the county/local level without the participation of county and local frequencies. It will be necessary to integrate into the system the frequencies of agencies that join the network. It is envisioned that the licenses for these frequencies could continue to be held at the county/local level if preferred. Sufficient 700 and 800 MHz frequencies will be available to meet the expected demand.

A migration path will be developed to assist agencies in moving from their present system into the trunking system. Statewide frequency resources can be made available for use in the interim while county/local frequencies are migrated into the trunking system. Prior participation in the statewide P25 radio and talk group ID plans will make the migration smoother by minimizing the changes that end users see.
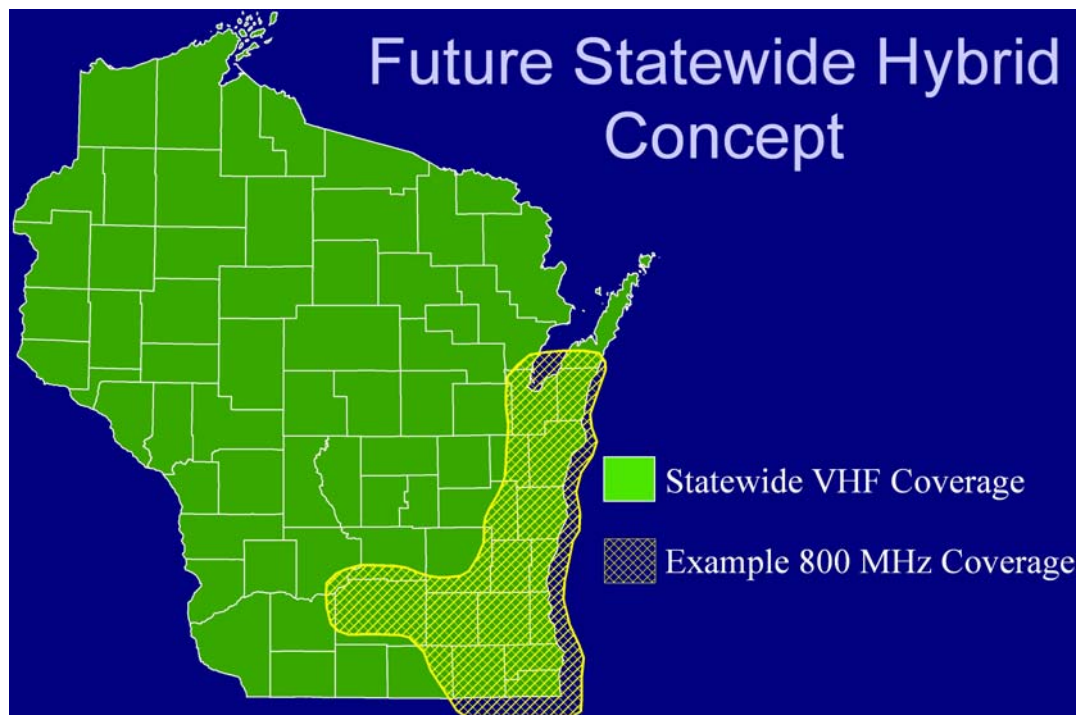
Figure 4: Statewide Hybrid Concept

This system will be designed to serve the needs of public service agencies at all levels of government including local (city/village/town), county, state, tribal, federal, and military. Inherent in the design will be interoperability – the ability of all participating agencies to communicate with one another as needed.

Over time agencies will be encouraged and be given incentives to change out proprietary systems in favor of standards based shared systems. Agencies will be discouraged from deploying proprietary systems and given support for long-term planning to make the change from proprietary to standards based systems with the least operational disruption.

The implementation of the WPSCS will coincide with the Federal Communications Commission (FCC) order to "narrowband" radio frequencies below 512 MHz. This means that sizes of channels operating in the in the low, VHF, and UHF bands will be decreased in half, and then decreased in half again by 2013. Analog frequencies will be most affected by this change, which will mean decreased audio quality and performance. Equipment operating in wideband (most of Wisconsin) that is incapable of narrowbanding will need to be replaced.

Far from being a burden, Wisconsin views the challenge of complying with the FCC order as an opportunity to improve public safety communications in the state. Migrating to narrowband will mean improved quality and performance, advanced features, less complex standards-based infrastructure, and full access to mutual aid channels within each band.

The WPSCS will be funded by a mix of federal, state, local, and tribal funding. Communities and government agencies will share in the cost of building and maintaining the system. Recognizing that funding is a significant challenge to the implementation of this goal, the state will seek to leverage multiple funding sources, including various federal grant programs, and will seek to maximize the value of this funding by requesting a local funding commitment for a portion of the project by recipients of federal funding. The state will also seek to include funding for the WPSCS in the 2009-2011 biennial budget

Timeline

2006 – 2007   Develop the plan for a statewide VHF/700/800 hybrid shared trunking system. Involve a consultant to assist with planning and grant/funding sources. Begin upgrades that will support the future WPSCS build-out, including:

- Project 25 repeaters that meet or can be upgraded to meet the Project 25 Inter- Subsystem Interface (ISSI) standards and can be upgraded to trunking operation
- Microwave interconnections between counties

    Secure engineering and project services of a major communications engineering company. The high cost of the engineering (approx. $5 million) would be heavily weighted to the startup of the project and then as the project progresses the cost savings would pay for the engineering in the later stages of the project.

2008 – 2009   Begin pilot implementation with strategic partners. Seek additional state funding in the 2009-2011 biennial budget.

2010 – 2011   Complete statewide backbone implementation.

2012 – 2013   Complete migration of agencies to system. (This timeframe coincides with the FCC requirement for migration to narrowband operation.)

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Appendix A: State Interoperability Executive Council (SIEC)

Governor Jim Doyle created the Wisconsin SIEC via Executive Order # 87 on February 2, 2005. The executive order defined the membership and mission of the council.

Executive Order # 87

Relating to the Creation of the State Interoperability Executive Council (SIEC)

WHEREAS, Wisconsin recognizes the importance of the public safety and protection of public and private property throughout the state; and

WHEREAS, emergency first responders and other vital emergency services utilize different radio frequencies and technologies that are often not interoperable; and

WHEREAS, Wisconsin recognizes the significance of interoperable technology to enable communication emergency first responders in times of emergencies to enhance public safety and homeland security; and

WHEREAS, interoperable public safety communications between and within jurisdictions is critical to the mission of public safety; and

WHEREAS, the attainment of interoperable communications requires statewide coordination and leadership;

NOW, THEREFORE, I, Jim Doyle, Governor of the State of Wisconsin, by the authority vested to me by the Constitution and the laws of this State, and specifically by Section 14.019 of the Wisconsin Statutes, do hereby:

1. Create the State Interoperability Executive Council (hereinafter the "SIEC"); and
2. Provide that the Council shall consist of fifteen [15] members appointed by the Governor to serve at the pleasure of the Governor; and
3. Provide that the members of the Council shall include at least the following individuals:

   - Executive Director of the Office of Justice Assistance (or designee);
   - Adjutant General (or designee);
   - Secretary of the Department of Natural Resources (or designee);
   - Secretary of the Department of Transportation (or designee);
   - Chief Information Officer, State of Wisconsin, Administrator of the Division of Enterprise Technology, Department of Administration (or designee);
   - a chief of police;
   - a sheriff;
   - a fire chief;
   - a local emergency management professional; and
   - a tribal official;

4. Provide that the Governor shall designate two (2) members on the Council as chair and

> vice-chair to serve in this capacity at the pleasure of the Governor; and
> 5. Provide that the Council shall have the following mission:
>   - Set goals and objectives within a timeframe to achieve statewide public safety radio interoperability; and
>   - Develop and periodically review a strategy for achieving public safety radio interoperability including but not limited to advising the Office of Justice Assistance on the allocation of homeland security and other funding available for this purpose; and
>   - Set technical and operational standards for interoperable radio communications in Wisconsin; and
>   - Develop short and long-term recommendations for local units of government on actions that may be required to achieve public safety radio interoperability in Wisconsin;
> 6. Direct that the Wisconsin Office of Justice Assistance shall provide staff support for the Council.
>
> **IN TESTIMONY WHEREOF**, I have hereunto set my hand and caused the Great Seal of the State of Wisconsin to be affixed. Done at the Capitol in the City of Madison this second day of February, in the year two thousand five.
>
>
>
> JIM DOYLE
>
> Governor

Current SIEC membership includes:

- Allen, Mindy   Green County EMS Project Manager
- Cameron, Neil   Fire Chief, Appleton Fire Department
- Collins, David   Superintendent of the Wisconsin State Patrol (Designee for the Secretary of the Department of Transportation)
- Czaja, Thomas   Chief of Police, Village of Fox Point
- Rahn, Brian   Sheriff, Washington County
- Miszewski, Matt   Chief Information Officer (CIO), State of Wisconsin
- Oitzinger, Douglas   Mayor, Marinette
- Riseling, Sue (Vice Chair)   Associate Vice Chancellor/Chief, UW-Madison Police
- Ritchie, Thomas   Barron County
- Schliesman, Ben   Kenosha County EM Director
- Smith, Johnnie   Administrator, Wisconsin Emergency Management (Designee for Adjutant General)
- Spenner, David   Chief of Police, Racine Police, Racine
- Stark, Randy   Chief Warden, Department of Natural Resources (Designee of the Secretary)
- Steingraber, Dave (Chair)   Executive Director, Office of Justice Assistance

The SIEC chair and vice chair were designated by the Governor to provide leadership and direction to the committee. The SIEC convenes a meeting of the full meeting approximately every month. The meetings are open to the public. The committee is further divided up into three sub-committees: Operations, Technical and Outreach, each of which are chaired by a member of the SIEC.

Operations

The operations subcommittee exists to foster interoperability among jurisdictions through the implementation of standards for use and operation. This subcommittee's primary focus is on overcoming the human barriers to interoperability. A high emphasis is placed on improving the training first responders receive.

Technical

The technical subcommittee was created to set technical standards and identify the technology suited to meet current and future interoperability needs. The Technical Sub-committee makes recommendations on engineering specifications of systems and other technical issues regarding interoperability. A major goal of the technical sub-committee is to ensure that the equipment.

Outreach

The Outreach subcommittee focuses on keeping the citizens of the state and users of the system informed about the current level of interoperability and promoting understanding of the decisions of the SIEC. The Outreach subcommittee is responsible for the development of the SIEC website and other community outreach events including the regional listening sessions that were held in June 2005.

More information about the SIEC, including past and future meetings, can be found on the SIEC website at http://www.siec.wi.gov

Appendix B: Mutual Aid Radio Channels (MARC) Plan

DESCRIPTION
The Wisconsin Mutual Aid Radio Channel (MARC) was established to provide a common radio frequency to be used statewide by state and local public safety agencies during periods of man-made or natural disasters and other emergencies where interagency coordination is required.

It operates under appropriate Federal Communications Commission (FCC) Rules and Regulations and is administered by the State of Wisconsin through the State Patrol Bureau of Communications. The Wisconsin Chapter of the Association of Public Safety Communications Officials (APCO) Interagency Communications Committee (Committee) exercises general supervision and disciplinary control.

ELIGIBILITY
Participation in MARC is open to all public safety and local government agencies, including law enforcement, fire, EMS, DPW, highway maintenance, emergency government, forestry, and other state agencies.

APPLICATION PROCEDURES
Requests for authorization on MARC will be submitted to the Wisconsin State Patrol Bureau of Communications, POB 7912, Madison WI 53707-7912. All mobiles will be operated under the State held license WNPG812. Requests should include the number of radios to be authorized. Requests for mobile authorizations from eligible agencies will be processed immediately.

All base and repeater stations will be licensed by the local agency. Requests for authorizations for base, repeater, portable repeater, and control stations should include the FCC license application form and will be approved by the Committee.

USAGE
MARC is a mutual aid channel for use by all public safety and local government agencies involved in any incident requiring a multi-discipline response where no other common frequency exists between responding agencies. This channel is for on scene command and coordination. It is intended that this channel will facilitate communications when the Incident Command System is used. Emergency traffic has priority.

MARC supports both repeater and simplex (radio to radio direct) operation. The repeater channel name is MARC 1 and the simplex channel name is MARC 2.

MARC 2 is the common landing zone coordination channel for communications between medical helicopters responding to an incident scene and ground units.

MOBILES AND PORTABLES
MARC is designed primarily for short range mobile to mobile use. All public safety and local government VHF radios should include the MARC channels. Authorized mobiles are required to have MARC 2 and are highly encouraged to have MARC 1. MARC is a primary interoperability resource in Wisconsin and there is an expectation that all VHF radios will be equipped with these channels. Mobiles will identify with the name of their agency and their unit number. All mobile units will identify with the statewide callsign "WNPG812" after each conversation.

BASE STATIONS
Base operation is secondary to mobile use. Base station technical parameters will be limited to that which is necessary to cover the applicant agency's jurisdiction. Patch capability from other channels to/from MARC is not permitted without prior authorization. Base stations may be restricted in some state border areas due to adjacent state use. Automatic callsign identifiers are not permitted.

CONTROL STATIONS
Any eligible agency may operate, with approval and licensing, a low power "20 foot rule" control station for use when an area repeater is activated.

REPEATERS
Repeater operation is secondary to mobile use. Each county will be authorized one controlling agency, normally the countywide dispatch center, to provide countywide repeater coverage. This agency must also provide 24 hour monitoring of the channel. Repeaters and the associated communications centers are required to monitor both MARC 1 and MARC 2. **Repeaters will be disabled until requested to be turned on by an Incident Commander or other user. Only one repeater may be turned on in a given area at one time**. All communications centers operating repeaters are required to cooperate to minimize interference and must have the ability to turn the repeater function on and off at any time. Base station technical parameters will be limited to that which is necessary to cover the applicant agency's jurisdiction. Long term patches from other channels to/from MARC are not permitted without prior authorization. Repeaters may be restricted in some state border areas due to adjacent state use.

Recommended specifications for fixed repeaters include:
-   Wireline or microwave control between dispatch center and repeater
-   Second receiver to monitor MARC 2
-   Satellite voting receivers are desirable in order to provide good portable radio coverage
-   DTMF decode capability on the repeater for On, Off, and Universal Off control
    Contact the state frequency coordinator for DTMF code assignments.
-   Voice identifier to state callsign and county or site name (or number) every half hour
    while in repeat mode

Some products which can provide the above DTMF control and voice identification functions include the CAT-250 and other products from Computer Automation Technology, www.catauto.com or the RC-110 from Arcom Communications, www.ah6le.net/arcom/8.html.

Automatic callsign identifiers are not permitted when the station is not in the repeater mode.

PORTABLE REPEATERS
Any eligible agency may operate, with approval and licensing, a low power portable repeater for temporary use at a specific incident.

TECHNICAL INFORMATION
Mobiles and Portables:
        MARC 1 transmit 153.845, receive 151.280, CTCSS 136.5
        MARC 2 transmit 151.280, receive 151.280, CTCSS 136.5
Control Stations:
        MARC 1 transmit 153.845, receive 151.280, CTCSS 136.5
Base Stations:
        MARC 2 transmit 151.280, receive 151.280, CTCSS 136.5

Repeaters:
      MARC 1 transmit 151.280, receive 153.845, CTCSS 136.5
      MARC 2 transmit 151.280, receive 151.280, CTCSS 136.5

All operation is analog wideband FM. Narrowband operation will be implemented in the future in compliance with FCC requirements and a statewide migration plan. Voice privacy/encryption, paging/signaling, and digital operation are not permitted.

For additional information or authorization, contact the Wisconsin State Patrol Bureau of Communications, the state frequency coordinator, or the Wisconsin Chapter of APCO.

05/05

MUTUAL AID RADIO CHANNEL REPEATER CONTACTS

AGENCY	LOCATION	DISPATCH	SUPERVISOR
Barron County	Portable/Barron	715-537-3106	Gay Radosevich
Chippewa County	Eagle Point	715-726-7701	Tim Blizek
Columbia County	Portage	608-742-4166	Tracy Morrical
Dane County	Madison	608-267-3913	Duke Ellingson
Eau Claire County	Fall Creek	715-839-4972	Pam McInnis
Jackson County	Black River Falls	715-284-2656	Steve Schreiber
Kenosha County	Bristol	262-605-5001	Dolly Brennan
La Crosse County	La Crosse	608-785-9634	Jeanette Lenser
Juneau County	Mauston	608-847-5649	Teri Wafle
Marathon County	Rib Mountain	715-849-7791	Jason Plaza
Marinette County	Portable/Marinette	715-732-7660	Erik Lowman
Outagamie County	Appleton & Binghamton	920-832-2264	Mary Schuelke
Ozaukee County - future	Port Washington	262-284-7172	Wendy Maechtle
Pierce County	Ellsworth & Portable	715-273-5051	Mike Knoll
Racine County	Yorkville	262-636-3213	Bob Kacmarcik
Rock County - future	Janesville	608-757-2244	Dave Sleeter
Sawyer County	Portable/Hayward	715-634-5213	Brian Cody
Sauk County	North Freedom	608-355-4495	Dena Wienke
Shawano County	Portable/Shawano	715-526-3111	Jerry Thorpe
St. Croix County	Hammond	715-386-4701	Gary Kollman
Waupaca County	Scandinavia	715-258-4466	Gary Heschke
Winnebago County	Omro	920-424-0061	Kathy Biggar
Walworth County	Elkhorn	262-741-4400	Jay Maritz
State Patrol	Chilton	920-929-3703	Nancy Olig
	Janesville	608-846-8521	Linda Palmer
	Mauthe Lake/ Cascade	920-929-3703	Nancy Olig
	Mayville	920-929-3703	Nancy Olig
	Oxford	715-845-7857	Tom Wrysinski
	Wausau/ Rib Mountain	715-845-7857	Tom Wrysinski
Dept. of Natural Resources	Portable/Woodruff	715-358-9216	Dave Christenson
	Portable/Wis. Rapids	715-421-7841	Lloyd Dettwiler
WI Emergency Management	Portable/Eau Claire	800-943-0003	Rick Risler

Submit updates to Carl Guse, WSP BOC at 608-266-2497 or carl.guse@dot.state.wi.us

03/05

State of Wisconsin
Mutual Aid Radio Channel

MARC Repeater Locations
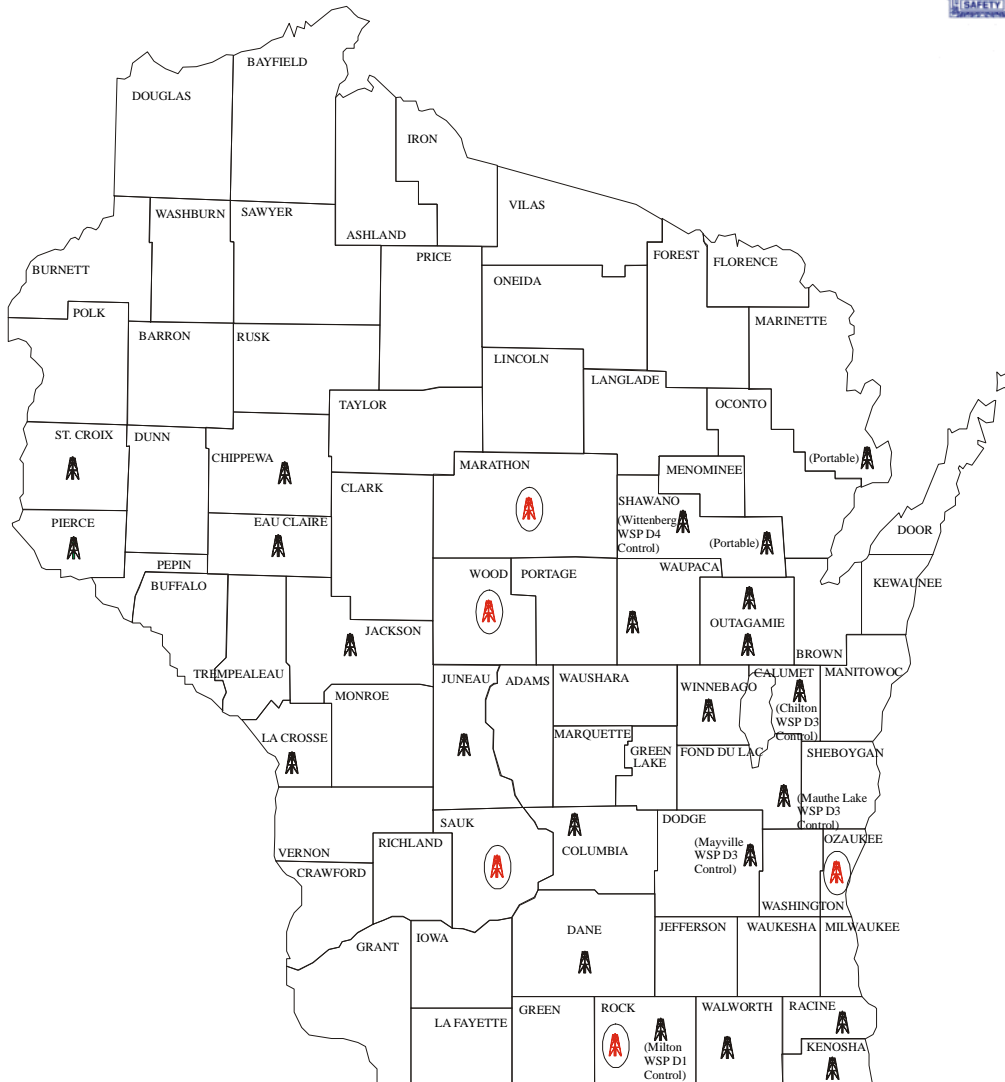
Active Repeaters

Future Repeaters

Updated by JDO - 7/16/2004
D:\Maps\MARC Maps\MARC Repeater Location Map.cdr

Appendix C: Statewide Mutual Aid Frequency Plan

Table of Contents

This state plan for mutual aid communications outlines public safety mutual aid and on-scene tactical radio communications frequencies available in Wisconsin. All public safety and governmental agencies are encouraged to implement these frequencies.

Updates in 2006 Edition

As interoperability planning in Wisconsin evolves and matures, a number of changes have been implemented since the last edition of this plan.

The statewide EMS channels have been given simplified names for reference (EMS A, EMS B, and EMS C). In practice, the hospital name will continue to be used on these channels. The A, B, and C letters provide an easy suffix to differentiate between the channels a hospital may have. Statewide tones are also established for these channels.

EMS C (State EMS Coordination) is taking on added duties as an alternate to MARC2 for medical helicopter landing zone coordination.

The FIRECOM name will retire after 25 years of good service in favor of the Mutual Aid Box Alarm System FG BLUE name.

Likewise, WISTAC 1 is replaced by the MABAS IFERN channel.

In conjunction with those changes, WISTAC 2 is renamed as MARC3 and WISTAC 3 is renamed as MARC4.

National channel nomenclature has been established by the National Coordination Committee for nationwide interoperability channels. Those names are now included for cross reference purposes. Radios with large displays can be programmed to include both the state and national names.

A new channel has been established, known as NATSAR for National Search and Rescue. This channel will provide a standard statewide interface between public safety agencies and private/volunteer search and rescue organizations.

The provision for digital operation on the VTAC channels has been eliminated to reduce interoperability problems.

The WISPERN channel is planned to convert to narrowband operation by 2011. It is expected that the other statewide mutual aid channels will also follow that timeline.

The end of 2007 is the target to have these changes implemented.

And, of course, the frequency chart has been updated to reflect the most current information available to the state frequency coordinator. Note that some of the listings reflect future plans.

Law Enforcement

In general, each county will have a unique Dispatch repeater channel. Some counties have an alternate Dispatch channel.

Fire/Rescue/EMS

In general, each county will have a unique Dispatch channel, a Paging channel, and a Local simplex channel. Some counties may combine the functions of these channels. A pool of shared public safety on scene tactical channels has been established for fireground communications. Use of frequencies outlined in the state plan will increase the number of tactical channels available and provide for a high degree of interoperability between units at an incident.

Dispatch – a channel for communications between dispatch and field units, also unit to unit communications for longer range if through a repeater
Paging – a channel primarily for transmitting alerting messages to paging receivers
Local – a county specific channel for local administrative and training, usually a simplex frequency
Fireground – a channel for on scene tactical communications

Highway/Local Government

Each county is assigned a county highway department frequency (pair) and a local government frequency for road maintenance and other municipal operations.

Wisconsin Countywide Public Safety Frequencies

The following is a list of frequencies available in Wisconsin counties. In most counties all agencies will share these channels. Large cities will have their own local channels.

COUNTY	LAW 1	LAW 2	FIRE DISPATCH	FIRE/EMS PAGING	FIRE LOCAL	HIGHWAY DEPT	LOCAL GOVT
Adams	154.755 173.8	154.755 173.8	151.325 241.8	154.100 173.8	154.415 173.8	159.120 82.5	155.025
Ashland	155.565 107.2	154.785 TBD	154.995 D251	154.995 D251	154.400 107.2	156.240 146.2	155.820
Barron	155.775 88.5	155.430 TBD	151.235 141.3	151.235 141.3	154.310 141.3	159.120 88.5	155.145
Bayfield	154.740 114.8	154.740 114.8	154.980 146.2	154.980 146.2	154.130* 146.2	151.010 94.8	155.145
Brown	154.740 146.2	154.890 146.2	154.370 179.9	154.040 179.9	154.130* 179.9	151.115 131.8	159.120
Buffalo	155.115 114.8	155.115 114.8	154.385 156.7	154.385 156.7	154.385 156.7	151.085 71.9	154.100
Burnett	155.670 110.9	154.7375 TBD	155.865 136.5	155.865 136.5	154.415 110.9	156.165 127.3	154.980
Calumet	155.040 173.8	N/A	154.220 186.2	154.220 186.2	156.105 186.2	151.100 103.5	155.085
Chippewa	155.415 162.2	155.070 110.9	154.430 103.5	155.835 110.9	154.250 D261	151.055 110.9	154.040
Clark	155.250 127.3	155.805 127.3	155.955 192.8	155.955 192.8	154.370	156.180 192.8	155.055
Columbia	154.875 114.8	155.415 167.9	151.220 203.5	154.145 114.8	154.430 114.8	151.025 162.2	155.085
Crawford	155.685	155.655	154.310	154.310	154.310	156.120	155.085

	D152	151.4	151.4	151.4	151.4	192.8	
Dane	155.655 167.9	154.845 167.9	158.745 167.9	158.775 CS	154.070 167.9	151.055 167.9	154.100
Dodge	155.745 141.3	154.785 141.3	154.325 141.3	154.445 141.3	154.280* 141.3	151.115 127.3	155.895
Door	155.520 D051	154.950 D051	154.340 141.3	151.190 D051	154.430 D051	156.180 131.8	155.085
Douglas	158.730 151.4	155.490 151.4	154.370 77.0	154.370 77.0	154.220 CS	158.775 127.3	154.040
Dunn	155.595 77.0	155.595 77.0	158.775 91.5	158.775 91.5	154.190 136.5	159.195 114.8	154.055
Eau Claire	154.875 162.2	154.950 192.8	155.880 210.7	155.880 210.7	154.220 167.9	453.950 67.0	155.940
Florence	155.580 131.8	155.580 131.8	158.820 127.3	155.580 131.8	154.220 131.8	156.240 D464	158.820 127.3
Fond du Lac	155.625 186.2	155.970 186.2	154.355 186.2	154.355 186.2	154.070 186.2	151.055 127.3	155.940
Forest	155.730 NAC 003	155.730 NAC 003	155.895 127.3	155.895 127.3	154.190 127.3	150.995 186.2	155.055
Grant	155.865 123.0	155.490 D	155.745 D132	155.925 CS	154.340 123.0	150.995 127.3	154.040
Green	154.725 91.5	155.610 123.0	154.160 97.4	163.250 CS	154.355 123.0	156.180 88.5	155.805
Green Lake	155.490 136.5	155.550 136.5	154.400 136.5	154.400 136.5	154.010* 136.5	159.120 127.3	155.145
Iowa	155.595 100.0	155.595 100.0	154.415 123.0	154.385 123.0	154.430	37.90 103.5	155.085
Iron	159.090 NAC 103	159.090 103.5	155.955 123.0	155.955 123.0	154.160	151.025 179.9	154.040
Jackson	154.815 82.5	155.685	154.445 123.0	154.445 123.0	154.445 123.0	159.135 141.3	155.820
Jefferson	154.860 107.2	155.145 107.2	154.370 107.2	154.055 107.2	154.415 107.2	156.240 173.8	155.925
Juneau	156.210 82.5	154.725 167.9	154.190 82.5	154.190 82.5	154.220	158.805 107.2	159.195
Kenosha	155.955 107.2	155.625 107.2	154.250 118.8	154.250 118.8	154.250 118.8	151.055 131.8	155.145
Kewaunee	155.190 D162	155.670 D051	154.310 D051	155.715 D043	154.145 146.2	151.085 114.8	155.895
La Crosse	155.430 203.5	155.520 203.5	154.130* 203.5	154.130* 203.5	154.205 203.5	151.025 131.8	154.055
Lafayette	159.150 114.8	155.880 192.8	154.085 114.8	154.085 114.8	154.385 114.8	158.820 131.8	154.025
Langlade	154.875 107.2	155.640 107.2	155.025 127.3	155.025 127.3	154.310 146.2	151.025 107.2	154.025
Lincoln	154.800 103.5	155.640 103.5	154.980 103.5	154.980 103.5	154.400 103.5	151.1225	155.115
Manitowoc	159.210 192.8	153.740 192.8	154.280* 192.8	154.280* 192.8	154.010* 192.8	159.165 141.3	154.980
Marathon	159.210 186.2	155.520 186.2	154.340 167.9	154.965 186.2	154.235 167.9	151.100 114.8	154.995
Marinette	155.535 NAC 666	155.535 173.8	154.010* 173.8	154.010* 173.8	154.355 173.8	159.105 146.2	154.085
Marquette	155.190 136.5	155.250 91.5	154.130* 136.5	155.880 136.5	154.130* 136.5	151.085 131.8	154.025
Menominee	154.815	154.785	155.040	155.040	155.040	37.92	155.715

	D245	146.2	D116	D116	D116	D073	
Milwaukee North	800 MHz trunking	800 MHz trunking	154.340 141.3	154.340 141.3	154.445 97.4	800 MHz trunking	800 MHz trunking
Milwaukee Central	800 MHz trunking	800 MHz trunking	800 MHz trunking	800 MHz trunking	800 MHz trunking	800 MHz trunking	800 MHz trunking
Milwaukee South	800 MHz trunking	800 MHz trunking	154.220 97.4	154.220 97.4	154.415 167.9	800 MHz trunking	800 MHz trunking
Monroe	155.625 156.7	155.085 156.7	154.235 156.7	154.235 156.7	154.400 156.7	154.115 225.7	155.955
Oconto	155.430 179.9	154.755 179.9	151.250 TBD	155.580 TBD	154.235 179.9	151.055 179.9	154.115
Oneida	154.725 114.8	155.640 114.8	154.445 114.8	155.805 114.8	154.355 114.8	151.175 146.2	155.040
Outagamie	155.700 107.2	155.820 107.2	154.250 CS	154.250 CS	154.385 107.2	150.995 151.4	155.715
Ozaukee	800 MHz trunking	800 MHz trunking	800 MHz trunking	154.160 107.2	800 MHz trunking	800 MHz trunking	800 MHz trunking
Pepin	156.210 103.5	155.730 77.0	156.210 103.5	156.210 103.5	154.175 103.5	150.995 151.4	158.835
Pierce	155.130 186.2	155.655 186.2	154.400 186.2	152.0075 CS	154.130* 186.2	159.135 107.2	154.980
Polk	155.550 179.9	154.800 179.9	154.025 179.9	154.025 179.9	154.235 179.9	151.010 103.5	155.955
Portage	155.595 NAC 010	155.670 146.2	154.385 206.5	154.385 206.5	154.325 206.5	151.010 127.3	155.025
Price	155.535 146.2	155.535 146.2	154.325 103.5	154.325 103.5	154.325 103.5	156.165 167.9	155.865
Racine	154.755 186.2	151.175 186.2	460.0125 118.8	460.0125 118.8	458.400 123.0	151.025 186.2	155.805
Richland	154.740 118.8	154.740 118.8	155.055 118.8	155.055 118.8	154.430	151.130 162.2	151.130 162.2
Rock	159.090 110.9	158.730 131.8	155.715 131.8	154.310 79.7	154.340 118.8	868.7375 203.5	151.040
Rusk	155.625 118.8	155.625 118.8	154.205 118.8	154.205 118.8	154.205 118.8	151.130 103.5	154.100
St. Croix	155.580 186.2	154.725 173.8	154.325 186.2	155.745 186.2	154.325 186.2	156.225 186.2	155.925
Sauk	155.700 82.5	155.310 D125	151.250 97.4	155.775 82.5	154.370 82.5	159.180 146.2	155.115
Sawyer	154.860 141.3	155.685	154.235 141.3	155.025 141.3	154.235 141.3	154.055 103.5	155.055
Shawano	159.090 85.4	155.640 94.8	155.145 156.7	155.145 156.7	154.070 94.8	159.135 127.3	155.880
Sheboygan	800 MHz trunking	800 MHz trunking	800 MHz trunking	154.415 141.3	800 MHz trunking	800 MHz trunking	800 MHz trunking
Taylor	155.565 110.9	155.565 110.9	154.175 88.5	154.175 88.5	154.310	155.760 127.3	155.115
Trempealeau	155.775 131.8	155.775 131.8	154.070 131.8	154.070 131.8	154.250 173.8	453.350 131.8	155.100
Vernon	154.995 167.9	154.995 167.9	154.860 TBD	154.175 167.9	154.175 167.9	453.700 D243	155.895
Vilas	155.550 D025	155.640 118.8	154.415 118.8	154.415 118.8	154.415 118.8	151.130 146.2	154.115
Walworth	856.4375 118.8	857.4375 118.8	453.375 173.8	453.675 118.8	453.9125 CS	453.825 173.8	159.135
Washburn	155.730	155.730	155.100	155.100	154.445	151.085	155.925

	151.4	151.4	151.4	151.4	151.4	151.4	
Washington	155.250 192.8	155.595 192.8	159.825 192.8	158.835 CS	154.190 192.8	151.130 173.8	154.055
Waukesha	800 MHz trunking	800 MHz trunking	800 MHz trunking	154.430 118.8	800 MHz trunking	800 MHz trunking	800 MHz trunking
Waupaca	154.860 100.0	155.535 203.5	151.235 123.0	154.205 100.0	154.145 123.0	154.115 167.9	154.025
Waushara	155.130 162.2	155.865 114.8	154.055 114.8	154.175 114.8	154.010* 114.8	156.240 123.0	155.715
Winnebago	158.730 162.2	158.835 162.2	158.775 118.8	158.775 118.8	154.445 136.5	159.180 118.8	155.025
Wood	155.550 82.5	155.730 82.5	154.160 82.5	154.160 82.5	151.250 82.5	151.025 91.5	154.040

04/06   CS = Carrier Squelch/no tone   TBD = To Be Determined

* indicates this frequency is also a statewide mutual aid channel

Corrections and updates to the above list can be directed to the state frequency coordinator:

Carl Guse
Wisconsin State Patrol
POB 7912
Madison WI 53707-7912

608-266-2497 office
608-267-4495 fax

carl.guse@dot.state.wi.us

Wisconsin Statewide Public Safety Common Mutual Aid Frequencies

These frequencies have been established for statewide public safety interagency and on scene communications and can be authorized for use under the state license.

Name	Interagency Fire Emergency Radio Network
	Previously Wisconsin Tactical 1
Acronym	**IFERN**
	Previously WISTAC 1
Receive Frequency	154.265
Receive Tone	None until transition from WISTAC1 to IFERN is completed
Transmit Frequency	154.265
Transmit Tone	210.7
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Mutual aid base/mobile dispatch
Name	Red Fireground
Acronym	**FG RED**
Receive Frequency	153.830
Receive Tone	None until after 01/01/07, then optionally 69.3
Transmit Frequency	153.830
Transmit Tone	69.3
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
Name	White Fireground
Acronym	**FG WHITE**
Receive Frequency	154.280
Receive Tone	None until after 01/01/07, then optionally 74.4
Transmit Frequency	154.280
Transmit Tone 74.4	
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
Name	Blue Fireground
	Formerly Fire Interagency Radio Emergency Communications
Acronym	**FG BLUE**
	Formerly FIRECOM
Receive Frequency	154.295
Receive Tone None	
Transmit Frequency	154.295
Transmit Tone	85.4

Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical

Name	Gold Fireground
Acronym	**FG GOLD**
Receive Frequency	153.8375
Receive Tone	91.5
Transmit Frequency	153.8375
Transmit Tone	91.5
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
	Narrowband operation only
	Do not use at the same incident as Red Fireground and MARC 1.

Name	Black Fireground
Acronym	**FG BLACK**
Receive Frequency	154.2725
Receive Tone	94.8
Transmit Frequency	154.2725
Transmit Tone	94.8
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
	Narrowband operation only
	Do not use at the same incident as IFERN and White Fireground.

Name	Gray Fireground
Acronym	**FG GRAY**
Receive Frequency	154.2875
Receive Tone	136.5
Transmit Frequency	154.2875
Transmit Tone	136.5
Primary Discipline	Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
	Narrowband operation only
	Do not use at the same incident as White and Blue Fireground.

Name	Interagency Fire Emergency Radio Network 2
Acronym	**IFERN2**
Receive Frequency	154.3025
Receive Tone	67.0
Transmit Frequency	154.3025

Transmit Tone   67.0

Primary Discipline   Fire/Rescue/EMS, Mutual Aid Box Alarm System
State Callsign   KO2099
Usage   Alternate mutual aid base/mobile dispatch
                      Do not use at the same incident as Blue Fireground and 154.310.

For the above frequencies, see the Mutual Aid Box Alarm System (MABAS) communications plan at: http://www.mabasradio.org/

Name   Mutual Aid Radio Channel 1
Acronym   **MARC1**
Receive Frequency   151.280
Receive Tone   136.5
Transmit Frequency   153.845
Transmit Tone   136.5
Primary Discipline   All public safety
State Callsign   WNPG812
Usage   Wide area interagency communications through repeaters

Name   Mutual Aid Radio Channel 2

Acronym   **MARC2**

Receive Frequency   151.280
Receive Tone   136.5
Transmit Frequency   151.280
Transmit Tone   136.5
Primary Discipline   All public safety
State Callsign   WNPG812
Usage   On scene tactical incident communications
                      Medical helicopter landing zone coordination

Name   Mutual Aid Radio Channel 3
                      Previously Wisconsin Tactical 2
Acronym   **MARC3**
                      Previously WISTAC 2
Receive Frequency   154.010
Receive Tone   71.9
Transmit Frequency   154.010

Transmit Tone   71.9

Primary Discipline   Fire/Rescue/EMS, alternate for other public safety
State Callsign   KO2099
Usage   Fireground operations, on scene tactical
                      Use is restricted in some areas of the state, see plan.

Name	Mutual Aid Radio Channel 4
	Previously Wisconsin Tactical 3
Acronym	**MARC4**
	Previously WISTAC 3
Receive Frequency	154.130
Receive Tone	82.5
Transmit Frequency	154.130
Transmit Tone	82.5
Primary Discipline	Fire/Rescue/EMS, alternate for other public safety
State Callsign	KO2099
Usage	Fireground operations, on scene tactical
	Use is restricted in some areas of the state, see plan.

For the above frequencies, see the Mutual Aid Radio Channel plan for more info (available at http://www.apcowisconsin.org/).

Name	State EMS Basic (BLS)
Acronym	**EMS B**
Receive Frequency	155.340
Receive Tone	None
Transmit Frequency	155.340
Transmit Tone	D156 for statewide; each hospital is assigned a tone
Primary Discipline	EMS
State Callsign	KH4762
Usage	Ambulance to hospital communications

Name	State EMS Coordination
Acronym	**EMS C**
Receive Frequency	155.280
Receive Tone	D156 for statewide/mobile; each hospital is assigned a tone
Transmit Frequency	155.280
Transmit Tone	D156 for statewide/mobile; each hospital is assigned a tone
Primary Discipline	EMS, Public Health
State Callsign	KH4762
Usage	Hospital to hospital communications, on scene coordination,
	Alternate for medical helicopter landing zone coordination
	Use may be limited in some areas due to non-EMS users.

Name	State EMS Advanced (ALS)
Acronym	**EMS A**
Receive Frequency	155.400
Receive Tone	None

Transmit Frequency	155.400
Transmit Tone	D156 for statewide; each hospital is assigned a tone
Primary Discipline	EMS only
State Callsign	KH4762
Usage	ALS ambulance to hospital and ambulance to ALS intercept communications

For the above frequencies, see the State EMS Communications plan for more info:

http://dhfs.wisconsin.gov/ems/system/PDF_files/Communication Plan_02.pdf

Name	Wisconsin Emergency Management Car to Car
Acronym	**WEM CAR**
Receive Frequency	156.000
Receive Tone	136.5
Transmit Frequency	156.000
Transmit Tone	136.5
Primary Discipline	Emergency Management
State Callsign	KGT483
Usage	On scene tactical incident communications

Name	Wisconsin Police Emergency Radio Network
Acronym	**WISPERN**
Receive Frequency	155.475
Receive Tone	None until after 06/01/06, then optionally 156.7
Transmit Frequency	155.475
Transmit Tone	156.7
Primary Discipline	Law Enforcement
	Use by other disciplines only if directed by law enforcement
State Callsign	KA6570
Usage	Interagency communications

See the WISPERN plan for more information (available at http://www.apcowisconsin.org/).

Name	Point to Point
Acronym	**POINT**
Receive Frequency	155.370
Receive Tone	None until after 06/01/06, then optionally 146.2
Transmit Frequency	155.370
Transmit Tone	146.2
Primary Discipline	Law Enforcement
	Use by other disciplines only if directed by law enforcement
State Callsign	KA6570
Usage	Base to base interagency communications

Name	National Search & Rescue
Acronym	**NATSAR**
Receive Frequency	155.160
Receive Tone	None or 127.3
Transmit Frequency	155.160
Transmit Tone	127.3
Primary Discipline	Search and Rescue
State Callsign	KO2099
Usage	Interface between public safety agencies and search and rescue groups Use may be limited in some areas due to non-EMS users.

Name	VHF Calling
Acronym	**VCALL**
Receive Frequency	155.7525
Receive Tone	156.7
Transmit Frequency	155.7525
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency calling channel, nationwide Use is restricted in some areas of the state, see plan.

Name	VHF Tactical 1
Acronym	**VTAC1**
Receive Frequency	151.1375
Receive Tone	156.7
Transmit Frequency	151.1375
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency tactical communications Use is restricted in some areas of the state, see plan.

Name	VHF Tactical 2
Acronym	**VTAC2**
Receive Frequency	154.4525
Receive Tone	156.7
Transmit Frequency	154.4525
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A

Usage	Public safety interagency tactical communications Use is restricted in some areas of the state, see plan.

Name	VHF Tactical 3
Acronym	**VTAC3**
Receive Frequency	158.7375
Receive Tone	156.7
Transmit Frequency	158.7375
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency tactical communications Use is restricted in some areas of the state, see plan.

Name	VHF Tactical 4
Acronym	**VTAC4**
Receive Frequency	159.4725
Receive Tone	156.7
Transmit Frequency	159.4725
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency tactical communications Use is restricted in some areas of the state, see plan.

Name	UHF Calling
Acronym	**UCALL**
Receive Frequency	453.2125
Receive Tone	156.7
Transmit Frequency	458.2125
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency calling channel (repeater) Use is restricted in some areas of the state, see plan.

Name	UHF Calling Direct
Acronym	**UCALLA**
Receive Frequency	453.2125
Receive Tone	156.7
Transmit Frequency	453.2125
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide

State Callsign   N/A
Usage   Public safety interagency calling channel (direct)
                        Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 1
Acronym   **UTAC1**
Receive Frequency   453.4625
Receive Tone   156.7
Transmit Frequency   458.4625
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (repeater)
                        Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 1 Direct
Acronym   **UTAC1A**
Receive Frequency   453.4625
Receive Tone   156.7

Transmit Frequency   453.4625

Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (direct)
                        Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 2

Acronym   **UTAC2**
Receive Frequency   453.7125
Receive Tone   156.7
Transmit Frequency   458.7125
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (repeater)
                        Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 2 Direct
Acronym   **UTAC2A**
Receive Frequency   453.7125
Receive Tone   156.7
Transmit Frequency   458.7125
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide

State Callsign   N/A
Usage   Public safety interagency tactical communications (direct)
                      Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 3
Acronym   **UTAC3**
Receive Frequency   453.8625
Receive Tone   156.7
Transmit Frequency   458.8625
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (repeater)
                      Use is restricted in some areas of the state, see plan.

Name   UHF Tactical 3 Direct
Acronym   **UTAC3A**
Receive Frequency   453.8625
Receive Tone   156.7

Transmit Frequency   453.8625

Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (repeater)
                      Use is restricted in some areas of the state, see plan.

For the above frequencies, see the state plan for more info (available at
http://www.apcowisconsin.org/). Note that all VCALL/VTAC/UCALL/UTAC frequencies are
narrowband only.

Name   International Calling

Acronym   **ICALL**
Receive Frequency   866.0125   (851.0125 after rebanding)
Receive Tone   156.7
Transmit Frequency   821.0125   (806.0125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency calling channel (repeater)

Name	International Calling Direct
Acronym	**ICALLD**
Receive Frequency	866.0125 (851.0125 after rebanding)
Receive Tone	156.7
Transmit Frequency	866.0125 (851.0125 after rebanding)
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency calling channel (direct)

Name	International Tactical 1
Acronym	**ITAC1**
Receive Frequency	866.5125 (851.5125 after rebanding)
Receive Tone	156.7
Transmit Frequency	821.5125 (806.5125 after rebanding)
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency tactical communications (repeater)

Name	International Tactical 1 Direct
Acronym	**ITAC1D**
Receive Frequency	866.5125 (851.5125 after rebanding)
Receive Tone	156.7
Transmit Frequency	866.5125 (851.5125 after rebanding)
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide

State Callsign N/A

Usage	Public safety interagency tactical communications (direct)

Name	International Tactical 2
Acronym	**ITAC2**
Receive Frequency	867.0125 (852.0125 after rebanding)
Receive Tone	156.7
Transmit Frequency	822.0125 (807.0125 after rebanding)
Transmit Tone	156.7
Primary Discipline	All public safety, nationwide
State Callsign	N/A
Usage	Public safety interagency tactical communications (repeater)

Name	International Tactical 2 Direct
Acronym	**ITAC2D**

Receive Frequency	867.0125 (852.0125 after rebanding)

Receive Tone   156.7
Transmit Frequency   867.0125   (852.0125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (direct)

Name   International Tactical 1
Acronym   **ITAC3**
Receive Frequency   867.5125   (852.5125 after rebanding)
Receive Tone   156.7
Transmit Frequency   822.5125   (807.5125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign N/A
Usage   Public safety interagency tactical communications (repeater)

Name   International Tactical 3 Direct
Acronym   **ITAC3D**
Receive Frequency   867.5125   (852.5125 after rebanding)
Receive Tone   156.7
Transmit Frequency   867.5125   (852.5125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (direct)

Name   International Tactical 4
Acronym   **ITAC4**
Receive Frequency   868.0125   (853.0125 after rebanding)
Receive Tone   156.7
Transmit Frequency   823.0125   (808.0125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (repeater)

Name   International Tactical 4 Direct
Acronym   **ITAC4D**
Receive Frequency   868.0125   (853.0125 after rebanding)
Receive Tone   156.7
Transmit Frequency   868.0125   (853.0125 after rebanding)
Transmit Tone   156.7
Primary Discipline   All public safety, nationwide
State Callsign   N/A
Usage   Public safety interagency tactical communications (direct)

For the above frequencies, see the NPSPAC Region 45 and 54 plans for more info.

There are also designated interoperability frequencies in the public safety 700 MHz band that are subject to planning by the State Interoperability Executive Council. At present, more information is available at the CAPRAD web site: http://caprad.nlectc.du.edu/login/home

The transmit and receive references listed above are for mobile and portable operation, not for base stations.

Usage

All public safety agencies in Wisconsin are encouraged to implement the statewide common frequencies. In some cases there are local assignments that may conflict with the statewide use plan. It is highly desirable for these situations to be integrated into the state plan. The state frequency coordinator will work with those county and local agencies affected to address these situations.

The state frequency coordinator will work with those counties interested in establishing a county paging or local simplex frequency where none is in use. These additional frequency assignments will be highly dependent on frequency availability. Counties and agencies with additional frequencies are encouraged to consider implementing the statewide plan frequencies and making currently licensed simplex frequencies available for reassignment.

Frequency Use Authorization

All users must either hold their own license or be authorized by letter to operate under another qualified licensee's license in order to legally transmit on a frequency. In many cases, local agencies can receive their authorization from the county. To receive authorization to operate under a statewide license, complete and submit the Frequency Authorization Request form. Generally, only mobile and portable radios can be authorized to operate under someone else's license; base stations must be licensed for a specific location.

Updates and Revisions

This document will be updated annually or as needed to reflect changes due to FCC rules, narrowbanding, frequency assignments, etc.

Revision 2.1 prepared April 2006 by:

Carl Guse
State Frequency Coordinator
Wisconsin State Patrol
POB 7912
Madison WI 53707-7912
608-266-2497 office
608-267-4495 fax
carl.guse@dot.state.wi.us

STATE FREQUENCY AUTHORIZATION REQUEST

This is a request to operate mobile and/or portable radios under a state license.

Agency: _____

Address: _____
                 _____

Phone:_____

Fax: _____

Contact: _____

Email: _____

Channels/Frequencies Requested:
                 _____
                 _____
                 _____
                 _____
                 _____
                 _____

Number of radios: _____

Purpose/usage/other info:
_____
_____
_____
_____
_____

Submit request by email, fax, or mail to:

Carl Guse
Frequency Coordinator
Wisconsin State Patrol
POB 7912
Madison WI 53707-7912

608-266-2497
608-267-4495 fax
carl.guse@dot.state.wi.us

For internal use: Approved on _____ by _____

WISCONSIN STATEWIDE PUBLIC SAFETY COMMON FREQUENCY CHART

VHF Band

MOBILE RX FREQ	RX TONE	MOBILE TX FREQ	TX TONE	STATE NAME	NATIONAL NAME	STATE CALLSIGN	PRIMARY USE
155.475	CS	155.475	156.7	WISPERN	1LAW16	KA6570	Law Enforcement
155.370	CS	155.370	146.2	POINT	None	KA6570	Law Enforcement
151.280	136.5	153.845	136.5	MARC1	None	WNPG812	All Public Safety
151.280	136.5	151.280	136.5	MARC2	None	WNPG812	All Public Safety
154.010	71.9	154.010	71.9	MARC3	None	KO2099	All Public Safety
154.130	82.5	154.130	82.5	MARC4	None	KO2099	All Public Safety
156.000	136.5	156.000	136.5	WEM CAR	None	KGT483	Emergency Mgt.
155.340	CS	155.340	D156	EMS B	1EMS14	KH4762	EMS
155.280	D156	155.280	D156	EMS C	None	KH4762	EMS
155.400	CS	155.400	D156	EMS A	None	KH4762	EMS
154.265	CS	154.265	210.7	IFERN	1FIR7	KO2099	Fire
153.830	CS	153.830	69.3	FG RED	None	KO2099	Fire
154.280	CS	154.280	74.4	FG WHITE	1FIR9	KO2099	Fire
154.295	CS	154.295	85.4	FG BLUE	1FIR11	KO2099	Fire
153.8375*	91.5	153.8375*	91.5	FG GOLD	None	KO2099	Fire
154.2725*	94.8	154.2725*	94.8	FG BLACK	1FIR8	KO2099	Fire
154.2875*	136.5	154.2875*	136.5	FG GRAY	1FIR10	KO2099	Fire
154.3025*	67.0	154.3025*	67.0	IFERN2	1FIR12	KO2099	Fire
155.160	127.3	155.160	127.3	NATSAR	None	KO2099	Search & Rescue
155.7525*	156.7	155.7525*	156.7	VCALL	1CAL18	KO2099	All Public Safety
151.1375*	156.7	151.1375*	156.7	VTAC1	1TAC5	KO2099	All Public Safety
154.4525*	156.7	154.4525*	156.7	VTAC2	1TAC13	KO2099	All Public Safety
158.7375*	156.7	158.7375*	156.7	VTAC3	1TAC22	KO2099	All Public Safety
159.4725*	156.7	159.4725*	156.7	VTAC4	1TAC23	KO2099	All Public Safety

04/06   * Narrowband

WISCONSIN STATEWIDE PUBLIC SAFETY COMMON FREQUENCY CHART

800 MHz Band – before the rebanding process

MOBILE RX FREQ	RX TONE	MOBILE TX FREQ	TX TONE	NAME	NATIONAL NAME	PRIMARY USE
866.0125	156.7	821.0125	156.7	ICALL	8CAL90	All Public Safety
866.5125	156.7	821.5125	156.7	ITAC1	8TAC91	All Public Safety
867.0125	156.7	822.0125	156.7	ITAC2	8TAC92	All Public Safety
867.5125	156.7	822.5125	156.7	ITAC3	8TAC93	All Public Safety
868.0125	156.7	823.0125	156.7	ITAC4	8TAC94	All Public Safety
866.0125	156.7	866.0125	156.7	ICALLD	8CAL90D	All Public Safety
866.5125	156.7	866.5125	156.7	ITAC1D	8TAC91D	All Public Safety
867.0125	156.7	867.0125	156.7	ITAC2D	8TAC92D	All Public Safety
867.5125	156.7	867.5125	156.7	ITAC3D	8TAC93D	All Public Safety
868.0125	156.7	868.0125	156.7	ITAC4D	8TAC94D	All Public Safety

800 MHz Band – after the rebanding process (by 2008)

MOBILE RX FREQ	RX TONE	MOIBLE TX FREQ	TX TONE	NAME	NATIONAL NAME	PRIMARY USE
851.0125	156.7	806.0125	156.7	ICALL	8CAL90	All Public Safety
851.5125	156.7	806.5125	156.7	ITAC1	8TAC91	All Public Safety
852.0125	156.7	807.0125	156.7	ITAC2	8TAC92	All Public Safety
852.5125	156.7	807.5125	156.7	ITAC3	8TAC93	All Public Safety
853.0125	156.7	808.0125	156.7	ITAC4	8TAC94	All Public Safety
851.0125	156.7	851.0125	156.7	ICALLD	8CAL90D	All Public Safety
851.5125	156.7	851.5125	156.7	ITAC1D	8TAC91D	All Public Safety
852.0125	156.7	852.0125	156.7	ITAC2D	8TAC92D	All Public Safety
852.5125	156.7	852.5125	156.7	ITAC3D	8TAC93D	All Public Safety
853.0125	156.7	853.0125	156.7	ITAC4D	8TAC94D	All Public Safety

04/06

PRIORITY ORDER FOR IMPLEMENTATION OF VHF CHANNELS

This chart provides a general guide for the priority of implementation of channels in radios that do not have sufficient capacity to include all statewide interoperability channels.

In radios that have 16 channel zones, it is generally suggested that the most used channels be included in the 1st zone, other Priority 1 through 12 channels be included in the 2nd zone and Priority 13 through 24 channels be included in the 3rd zone.

PRIORITY	LAW ENFORCEMENT	FIRE	EMS	EMERGENCY MANAGEMENT	DPW/HWY
1	WISPERN	FG BLUE	EMS B	WEM CAR	WEM CAR
2	MARC1	MARC1	MARC1	MARC1	MARC1
3	MARC2	MARC2	MARC2	MARC2	MARC2
4	MARC3	MARC3	MARC3	MARC3	MARC3
5	MARC4	MARC4	MARC4	MARC4	MARC4
6	POINT	IFERN	IFERN	IFERN	IFERN
7	WEM CAR	FG RED	FG RED	FG RED	FG RED
8	FG BLUE	FG WHITE	FG WHITE	FG WHITE	FG WHITE
9	IFERN	WEM CAR	FG BLUE	FG BLUE	FG BLUE
10	EMS C	EMS C	EMS C	EMS C	EMS C
11	FG RED	WISPERN	WISPERN	WISPERN	WISPERN
12	FG WHITE	POINT	POINT	POINT	POINT
13	NATSAR	NATSAR	NATSAR	NATSAR	NATSAR
14	EMS B	EMS B	WEM CAR	EMS B	EMS B
15	EMS A	EMS A	EMS A	EMS A	EMS A
16	FG GOLD	FG GOLD	FG GOLD	FG GOLD	FG GOLD
17	FG BLACK	FG BLACK	FG BLACK	FG BLACK	FG BLACK
18	FG GRAY	FG GRAY	FG GRAY	FG GRAY	FG GRAY
19	IFERN2	IFERN2	IFERN2	IFERN2	IFERN2
20	VCALL	VCALL	VCALL	VCALL	VCALL
21	VTAC1	VTAC1	VTAC1	VTAC1	VTAC1
22	VTAC2	VTAC2	VTAC2	VTAC2	VTAC2
23	VTAC3	VTAC3	VTAC3	VTAC3	VTAC3
24	VTAC4	VTAC4	VTAC4	VTAC4	VTAC4

04/06

Appendix D: P25 Unit Identification Plan

The State of Wisconsin has established this plan for Project 25 digital radio unit IDs. This is the identification number that is programmed into the radio and can be decoded by receiving units. The purpose of this plan is to provide a logical plan for the assignment of unique radio identifiers to all potential Project 25 digital capable radios used by public safety agencies within the State of Wisconsin. The goal of the plan is to eliminate use of duplicate identifiers and maximize the benefit of the imbedded unit ID capability through the use of a number that is logically defined. This number can be tied to an alphanumeric display.

The unit identifier consists of 7 numbers (in decimal format).

A	B	C	D	E	F	G
County Code		Prefix	Unit			

A B   The first 2 digits will denote the county that the radio is based in or, for state and federal radios, the agency that owns it.

   01-72 Counties, using the standard numbering (see list on 2nd page)
   72-80 Reserved
   81-90 State Agencies
   91-99 Federal Agencies

C   The third digit is an optional prefix to differentiate between radios within a county that have the same unit number or radio call number, such as a mobile and portable assigned to an individual officer, or type of agencies.

   0   Default or mobile radio
   1   Portable radio
   2   Control station or third radio assigned to an individual or unit
   3   Fixed stations/bases/consoles/other

   4-9   Optionally used to differentiate between duplicate unit IDs used by different agencies within a county
   4   Police
   5   Fire
   6   EMS
   7   Emergency Management
   8   DPW
   9   Local Govt/Other/Non-Governmental

DEFG The unit ID of the vehicle, officer or person that the radio is assigned to, or the radio

For further information, contact Carl Guse, Frequency Specialist
Wisconsin State Patrol Bureau of Communications, POB 7912, Madison, WI 53707-7912
608-266-2497   608-267-4495 fax   carl.guse@dot.state.wi.us

11/23/05 Project 25 Unit ID Plan.doc

Wisconsin County/Agency List

1	Adams		51	Price
2	Ashland		52	Racine
3	Barron		53	Richland
4	Bayfield		54	Rock
5	Brown		55	Rusk
6	Buffalo		56	St. Croix
7	Burnett		57	Sauk
8	Calumet		58	Sawyer
9	Chippewa		59	Shawano
10	Clark		60	Sheboygan
11	Columbia		61	Taylor
12	Crawford		62	Trempealeau
13	Dane		63	Vernon
14	Dodge		64	Vilas
15	Door		65	Walworth
16	Douglas		66	Washburn
17	Dunn		67	Washington
18	Eau Claire		68	Waukesha
19	Florence		69	Waupaca
20	Fond du Lac		70	Waushara
21	Forest		71	Winnebago
22	Grant		72	Wood
23	Green		73	
24	Green Lake		74	
25	Iowa		75	
26	Iron		76	
27	Jackson		77	
28	Jefferson		78	
29	Juneau		79	
30	Kenosha		80	
31	Kewaunee		81	Dept. of Transportation/State Patrol
32	La Crosse		82	Dept. of Natural Resources
33	Lafayette		83	Dept. of Justice
34	Langlade		84	Dept. of Military Affairs
35	Lincoln		85	Dept. of Administration
36	Manitowoc		86	Dept. of Health & Family Services
37	Marathon		87	Dept. of Corrections
38	Marinette		88	University of Wisconsin
39	Marquette		89	
40	Menominee		90	
41	Milwaukee		91	US Dept. of Justice
42	Monroe		92	US Dept. of Treasury
43	Oconto		93	US Dept. of Homeland Security
44	Oneida		94	US Dept. of Agriculture
45	Outagamie		95	US Dept. of Interior
46	Ozaukee		96	
47	Pepin		97	
48	Pierce		98	
49	Polk		99	
50	Portage			

Examples

1	4	0	2	9	5	1
County Code		Prefix	Unit			

1402951   Mayville Ambulance 2951 (14 Dodge County)

2000110   Fond du Lac County (20) Sheriff squad fleet number 110 mobile radio
2010061   Fond du Lac County (20) Sheriff deputy 61 portable radio

4802702   Pierce County (48) Sheriff Lt. 2702 mobile radio
4812702   Pierce County (48) Sheriff Lt. 2702 portable radio

4921482   Osceola Fire Dept Pumper 1482 2nd portable radio (49 Polk County)

6700612   Hartford Police Dept Detective 612 (67 Washington County)

8100041   State Patrol Car 41 mobile radio
8110041   State Patrol Car 41 portable radio
8120041   State Patrol Car 41 control station

8210123   DNR Warden C123 portable radio
8200750   DNR Natural Resources Officer R750 mobile radio

These examples use the decimal format. Some programming software may require use of hex format.

Appendix E: P25 Compliance Definitions

There are four levels of compliance with regard to P25 standards:

1. **NON-Compatible**, **Non-Upgradeable**, i.e., the hardware is not P25 operational and cannot be reasonably upgraded to be P25 compliant.

2. **Upgradeable**, the hardware as it exists will NOT operate in a P25 compliant system but has been designed so as by upgrading the hardware and/or software the unit can be made P25 compliant [consideration MUST be given to the cost of the upgrade process when considering this state]

3. **P25 Compliant,** the hardware meets all of the phase one P25 specifications and with no modifications other than user programming, the hardware & software will operate in any manufactures P25 compliant system.

4. **P25 Compatible**, The hardware meets all of the P25 specifications without further modifications BUT goes beyond the base requirements and may have options and features which make it unique as those options may only operate within a system supplied by a specific vendor.

This plan follows the SIEC policy and establishes Level 3 – P25 Compliant as the standard for Wisconsin public safety radio systems.

Appendix F: Mutual Aid Channel Conflict Areas

153.845   MARC 1
Outagamie Co
Towns of Glenco and Arcadia (Trempealeau
Co)

154.265   IFERN
Sheboygan Co – now on 800 MHz trunking
Wood Co – is planning to reprogram
Columbia Co
De Pere (Brown Co)
City of Milwaukee
Township Fire Dept (Eau Claire Co)
Montello (Marquette Co)
Marathon Co – will release the frequency for
IFERN use
Poy Sippi (Waushara Co)

153.830   FG RED
Chippewa Falls
Outagamie Co
Jefferson Co
West Bend
Portage Co
Door Co
Dousman
City of Milwaukee
Village of Pewaukee – now on 800 MHz
trunking
Town of Pewaukee – now on 800 MHz
trunking
Eagle – now on 800 MHz trunking
Waukesha Co – now on 800 MHz trunking
St Croix Co
Hales Corners
Rudolph – is planning on reprogramming
Fitchburg
Wisconsin Dells
Mt Calvary
Sawyer Co

154.280   FG WHITE
Dodge Co
Manitowoc Co
Portage Co
City of Racine
Waupaca Co
Marathon Co
Town of Sherman (Iron Co)

154.010   MARC 3 (formerly WISTAC 2)
Wood Co – is planning to reprogram
Westby (Vernon Co)
Whitewater (Walworth Co)
Waushara Co
Manitowoc Co
Marinette Co
Township Fire Dept (Eau Claire Co)
Newbold (Oneida Co)
Gratiot (Lafayette Co)
Green Lake Co
Town of Linn (Lake Geneva)
Washington Co
Wauwatosa - now on 800 MHz trunking
Fond du Lac Co

154.130   MARC 4 (formerly WISTAC 3)
La Crosse Co
Marquette Co
Brown Co
City of Milwaukee
Greenwood (Clark Co)
Rudolph (Wood Co) – is planning to
reprogram
Bayfield Co
Town of Ross (Forest)
Manitowish Waters (Vilas Co)
Pierce Co

156.000   WEM CAR
North Shore Fire (Milwaukee Co.)